In the Specification:

Please delete the appendix introduced in the previous amendment filed on January 31, 2003.

Please replace the paragraph beginning on page 9, line 3 with the following:

Fig. 2 is a graph depicting the relationship between four-wave mixing-induced cross-talk and forward Raman gain according to one embodiment of the present invention. The following is the theoretical basis for the data determined in Fig. 2.

The four-wave mixing cross product can be expressed as:

$$(1)\ X_F(L) = \frac{P_F}{P_{ch}} = \left(\gamma \frac{D_{pqr}}{3}\right)^2 P_{ch}^2 \left| \int_0^L G(\zeta)\, e^{i\Delta\beta\zeta}\, d\zeta \right|^2$$

B1 Cont.

The term L refers to fiber length.

The term P_F refers to the four-wave mixing product power.

The term P_{ch} refers to power per channel at the fiber input.

The term γ refers to a non-linear coefficient of the fiber, $\gamma = \frac{2\pi\eta_2}{\lambda A_e}$ where η_2 is the refraction index of the fiber and A_e is the effective area of the fiber as explained in R.W. Tkach, and A.R. Chraplyvy, "Fiber Nonlinearities and Their Impact on Transmission Systems" in *I.P. Kaminov and Thomas L. Koch "Optical Fiber Communications IIIA"* Academic Press 1997, (hereinafter "Forghieri")the contents of which are herein incorporated by reference.

The term D_{pqr} is equal to 6 for three-tone products as explained in Forghieri.

The term $G(\xi)$ refers to the gain as it has evolved at a distance ξ along the fiber.

The term $\Delta\beta$ refers to the phase mismatch parameter and is defined by:

$$\begin{aligned} \Delta\beta &= \beta_p + \beta_q - \beta_r - \beta_F \\ (2)\qquad &= \frac{2\pi\lambda^2}{c}(f_p - f_r)(f_q - f_r)\left[D(\lambda) - \frac{\lambda^2}{c}\left(\frac{f_p + f_q}{2} - f\right)\frac{dD}{d\lambda}\right] \end{aligned}$$

as presented in Forghieri.

The term λ refers to a generic wavelength. The term f refers to the frequency corresponding to this generic wavelength.

The terms f_p, f_q, f_r refer to the frequencies of the channels giving rise to the mixing products.

The term $D(\lambda)$ refers to chromatic dispersion at wavelength λ.

The integral in 1) can be approximated as:

(3) $\int_0^L G(z)\exp(i\,\Delta\beta\, z)dz \approx \dfrac{1+G_F\, G_B \exp(-\alpha_s L)}{i\,\Delta\beta}$

The term α_s refers to the fiber attenuation at the pump wavelength.

(4) $P_{ASE,R} = 2h\upsilon\Delta\upsilon \int_0^L r_0 N_p(\xi)\exp\left(-\alpha_s(L-\xi)+\int_\xi^L r_0 N_p(\eta)d\eta\right)d\xi$.

The term $h\upsilon$ refers to the photon energy.

The term $\Delta\upsilon$ refers to the bandwidth over which the noise power is measured.

The term r_0 refers to the Raman gain coefficient of the fiber.

The pump photon number $N_p(z)$ is proportional to the pump power and, in the unsaturated gain approximation, is described by the formula:

(5)

$$N_P(z) = \frac{1}{r_0}\frac{1}{L_{eff,P}}\left(\ln(G_F)e^{-\alpha_P z} + \ln(G_B)e^{-\alpha_P(L-z)}\right)$$

The term α_P refers to the fiber attenuation at the pump wavelength.

The term $L_{eff,P}$ refers to the effective fiber length at the pump wavelength and is given by:

(6) $L_{eff,P} = (1-\exp(-\alpha_P L))/\alpha_P$

$P_{ASE,EDFA}$ is the ASE generated within the EDFA and is given by:

(7) $P_{ASE,EDFA} = 2h\upsilon\Delta\upsilon(G_A-1)n_{sp}$.

The term n_{sp} refers to population inversion factor.

Fig. 2 is a useful tool in selecting values for G_F and G_B. The x axis of the graph of Fig. 2 represents unsaturated forward Raman gain. The left y-scale of the graph of Fig. 2 represents input power per channel to fiber 115. The right y-scale of Fig. 2 reports the corresponding four-wave mixing-induced cross talk at the end of the whole link of 25 spans assuming that G_B provides the remainder of the 15 dB that G_F does not provide. To get this crosstalk, individual contributions from each span are added.